AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 of 2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0004	05-May-2004		

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than item 6)	CODE
USA ENGINEER DISTRICT, SEATTLE ATTN: CENWS-CT 4735 EAST MARGINAL WAY SOUTH SEATTLE WA 98134-2329	W912DW	**See Item 6**	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
	X	9A. AMENDMENT OF SOLICITATION NO. W912DW-04-R-0017
	X	9B. DATED (SEE ITEM 11) 06-Apr-2004
		10A. MOD. OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)
CODE / FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [X] is extended, [ ] is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning 0 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Central Heat Plant Low Emissions Tech., Malmstrom AFB MN -- See continuation.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) TEL: EMAIL:	
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED 05-May-2004

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

The following items are applicable to this modification:

CONTINUATION

A. The purposes of this amendment are as follows:

1. To extend the due date for receipt of proposals

   FROM: 2:00 PM Pacific Time on 7 May 2004

   TO: 2:00 PM Pacific Time on 11 May 2004;

2. To revise Section 00110; and

3. To revise Section 15555A.

B. The attached revised pages supersede and replace the corresponding pages. The attached revised specification sections supersede and replace the corresponding specification sections. Specification changes are generally identified, for convenience, by strikeout for deletions, and underlining of text for additions. All portions of the revised or new pages shall apply whether or not changes have been indicated.

C. NOTICE TO OFFERORS: Offerors must acknowledge receipt of this amendment by number and date on Standard Form 1442, BACK, Block 19, or by telegram.

D. All amendments are available for download this date on the Army Corps of Engineers website at http://www.nws.usace.army.mil/ct/.

Enclosure:
Revised Section 00110
Revised Section 15555A

SECTION 00110 – PROPOSAL SUBMISSION AND EVALUATION

1. INTRODUCTION:

1.1 Your firm is invited to submit a proposal in response to Request for Proposals (RFP) No. **W912DW-04-R-0017** entitled **Central Heat Plant Application of Low Emissions Tech., Malmstrom AFB, Montana**. This RFP establishes project requirements and provides procedures, format, and other data to assist offerors in preparing their proposals. **It is the intent of the Government to make award based upon initial offers, without further discussions or additional information.** A contract will be awarded to the firm submitting the proposal that conforms to the RFP, is considered to provide the most advantageous offer in terms of the evaluation factors, including price, and is determined to be in the best interest of the Government.

1.2 This project consists of removing existing burners and controls on two High Temperature Hot Water (HTHW) Generators and furnishing and installing natural gas burners. This will require the contractor to modify and repair existing HTHW generators as well as furnishing and installing: air heater baskets and seals on air heaters, new Variable Frequency Drives (VFD's) on Induced Draft (ID) fans, new ID fan drive motors, Spray Dryer Absorber (SDA) inlet temperature control bypass ductwork, opacity monitor purge air fans, an ash unloader system (possible option item) (including a pug mill, rotary feeder, and knife gate valve), a load simulator and interconnecting piping, a plant air receiver and instrument air receiver, desiccant air dryer, air compressor and interconnecting piping, instrument air supply for modifications requiring instrument air. The contractor will be responsible for demolitions and relocations work required for the above modifications as well as furnishing and placing concrete, steel and electrical work and all controls associated with the above modifications.

2. EVALUATION FACTORS:

2.1 Proposals will be evaluated on the basis of two criteria, **TECHNICAL** and **PRICE**. Award will be based upon evaluation of the technical criteria listed below, and price proposals.

2.2 **TECHNICAL EVALUATION CRITERIA:** The technical criteria, listed in **descending order of importance,** are as follows:

1. Relevant Experience of the Prime
2. Qualifications of Key Team Members
3. Past Performance of the Prime
4. Project Schedule
~~5. Temporary Heat Plan~~
~~6~~5. Extent of Small Business Participation

2.3 **RELATIVE IMPORTANCE DEFINITIONS:** For this evaluation, the following terms will be used to establish the relative importance of the technical criteria:

- More Important: The criterion is (two) times more important in value to the Government than another criterion.

2.4 **SUMMARY OF ORDER OF IMPORTANCE for Technical Criteria:**

- Criterion 1, 2, and 3 are equal to each other and are each more important than criterion 4 ~~and 5~~.

- Criterion 4 ~~and 5 are equal to each other and are each~~is more important than criterion ~~6~~5.

2.5 **EVALUATION STANDARDS.** Evaluation criteria will be rated using the following adjectival descriptions.

OUTSTANDING - Information submitted demonstrates offeror's potential to significantly exceed performance or capability standards. The offeror has clearly demonstrated an understanding of all aspects of the requirements to the extent that timely and the highest quality performance are anticipated. Has exceptional strengths that will significantly benefit the Government. The offeror convincingly demonstrated that the RFP requirements have been analyzed, evaluated, and synthesized into approaches, plans, and techniques that, when implemented, should result in outstanding, effective, efficient, and economical performance under the contract. Significantly exceeds most or all solicitation requirements. **VERY HIGH PROBABILITY OF SUCCESS.**

ABOVE AVERAGE - Information submitted demonstrates offeror's potential to exceed performance or capability standards. Has one or more strengths that will benefit the Government. The areas in which the offeror exceeds the requirements are anticipated to result in a high level of efficiency or productivity or quality. The submittal contains excellent features that will likely produce results very beneficial to the Government. Fully meets all RFP requirements and significantly exceeds many of the RFP requirements. Disadvantages are minimal. **HIGH PROBABILITY OF SUCCESS.**

SATISFACTORY (Neutral) - Information submitted demonstrates offeror's potential to meet performance or capability standards. An acceptable solution is provided. Either meets all RFP requirements for the criterion or contains weaknesses in some areas that are offset by strengths in other areas. A rating of "Satisfactory" indicates that, in terms of the specific criterion (or sub-criterion), the offeror has a reasonable probability of success, as there is sufficient confidence that a fully compliant level of performance will be achieved. The proposal demonstrates an adequate understanding of the scope and depth of the RFP requirements. No significant advantages or disadvantages. Equates to neutral. **REASONABLE PROBABILITY OF SUCCESS.**

MARGINAL – The submittal is not adequately responsive or does not address the specific criterion. The offeror's interpretation of the Government's requirements is so superficial, incomplete, vague, incompatible, incomprehensible, or incorrect as to be considered deficient. Proposal does not meet some of the minimum requirements. The assignment of a

rating within the bounds of "Marginal" indicates that mandatory corrective action would be required to prevent significant deficiencies from affecting the overall project. The offeror's plans or approach will likely result in questionable quality of performance, which represents a moderate level of risk to the Government. Low probability of success although the submittal has a reasonable chance of becoming at least acceptable. Significant disadvantages**. LOW PROBABILITY OF SUCCESS.**

UNSATISFACTORY – Fails to meet performance or capability standards. Unacceptable. Requirements can only be met with major changes to the submittal. There is no reasonable expectation that acceptable performance would be achieved. The proposal contains many deficiencies and/or gross omissions; fails to provide a reasonable, logical approach to fulfilling much of the Government's requirements; and/or fails to meet most or all of the minimum requirements. Very significant disadvantages. **VERY LOW PROBABILITY OF SUCCESS.**

2.6 DEFINITIONS OF STRENGTH, WEAKNESS AND DEFICIENCY:

Strength: **A substantive aspect, attribute, or specific item in the proposal that exceeds the solicitation requirements and enhances the probability of successful contract performance.**

Weakness: A flaw in the proposal that increases the risk of unsuccessful contract performance (i.e., meets the RFP requirements, but may have an impact on schedule or quality requirements). A ***weakness need not be corrected*** for a proposal to be considered for award, but ***may*** affect the offeror's rating.

Deficiency: A material failure of a proposal to meet the Government requirement or a combination of significant weaknesses in a proposal that increases the risk of contract performance at an unacceptable level. A deficiency ***must be corrected*** for a proposal to be considered for award.

3. PROPOSAL CONTENTS: Proposals shall be submitted in two parts: (a) Technical proposal and (b) Price proposal. Each part shall be submitted in a separate envelope/package, with the type of proposal (i.e., Technical or Price) clearly printed on the outside of the envelope/package. **For ease of evaluation, submit the proposal following the same organization and title format as specified in paragraph 4.3.6 SUMMARY OF TECHNICAL PROPOSAL FORMAT (for the technical proposal) and paragraph 5.1 SUMMARY OF PRICE PROPOSAL FORMAT (for the price proposal).**

4. TECHNICAL PROPOSAL:

4.1 A **COVER LETTER** should be the **first page** of the technical proposal and should include **(do not put this in the price proposal):**

(a) Solicitation number.

(b) Name, address, and telephone and facsimile numbers of the firm signing the SF 1442 (and electronic address).

(c) Names, titles and telephone and facsimile numbers (and electronic addresses) of persons authorized to negotiate on the firm's behalf with the Government in connection with this solicitation.

(d) Name, title, and signature of the person authorized to sign the proposal.

(e) A statement specifying agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any and all items upon which prices are offered at the proposed item prices.

(f) **FINAL PROPOSAL REVISION:** If required to submit a Final Proposal Revision, the accompanying cover letter must identify all changes made to the firm's initial proposal.

4.2 **GENERAL TECHNICAL PROPOSAL REQUIREMENTS:** Offerors submitting proposals for this project should limit submissions to data essential for evaluation of proposals so that a minimum of time and monies will have been expended in preparing information required herein. Elaborate artwork, expensive paper and bindings, and expensive/extensive visual and other presentation aids are unnecessary. However, in order to be effectively and equitably evaluated, the proposals must include information sufficiently detailed to clearly describe the offeror's experience and management capabilities to successfully complete the project. Any deviations from requirements should be clearly noted and justified in the proposal.

4.3 **MINIMUM SUBMITTAL REQUIREMENTS FOR TECHNICAL PROPOSAL:**

4.3.1 **RELEVANT EXPERIENCE OF THE PRIME.**

Submittal Requirements: Provide three (3) projects for the prime construction firm demonstrating relevant experience in the $1,000,000 to $5,000,000 range, or aggregate value of $6,000,000 over a 10-year period. "Relevant experience" is defined as experience constructing facilities similar to the project in this solicitation in scope, complexity, and dollar value, such as large boilers, pressure piping systems, and Bailey control systems. Only relevant projects currently in progress (at least 75% complete) or completed within the past ten (10) years shall be submitted. Start with the most recent and relevant projects and work backwards in time. The projects selected should clearly demonstrate the construction capabilities of the Offeror in one or more of the areas described in this paragraph.

Use a format similar to that shown in the table below to present this information.

Project Title & Location
Project Type (e.g., design-build (DB), construction (C))
Dollar Value (design $; construction $)
Start & Completion Dates (Month/Year)
Role of Firm(s) (e.g., prime) (address type of work performed and percentage of work, as

applicable)
Brief Description of Project (address how this relates to solicitation project)
Customer Point of Contact (i.e., name, relationship to project, agency/firm affiliation, city, state, current phone no.)
Awards or recognition received (if applicable)
Firms on the proposed team that performed this project

Evaluation Method: This criterion will be evaluated for the quantity and quality of experience demonstrated. The greater the relevance and the more recent the prior project experience, the higher the rating assigned during evaluations. Demonstration of experience in completing projects that had the unique characteristics of the proposed project will be evaluated favorably. Projects involving co-firing (simultaneous natural gas and coal) and stoker applications combustion control installations (Bailey/ABB INFI-90) on boilers of equal or larger size to those in this solicitation that have been in satisfactory operation for two (2) years may be given more consideration.

4.3.2 QUALIFICATIONS OF KEY TEAM MEMBERS

Submittal Requirements: The Offeror shall submit the names and résumés for key construction personnel that will be assigned to this project. In addition, the Offeror shall provide a concise summary of the duties and responsibilities for each of the proposed individuals which clearly indicates separate duties and responsibilities for each of the following positions; Project Superintendent, Project Manager, and Contractor Quality Control System Manager. The proposal must clearly present the separate credentials for each position of each person performing the duties of the position to which they are identified. Resumes must include a maximum of three (3) examples of project experience, and educational qualifications, if applicable. For project experience, provide the same information as described in 4.3.3 below. It is expected that the proposed key team members will be the individuals who perform work under the contract. **The contracting officer must approve substitute personnel.** Resumes should be no more than two (2) pages per individual and submitted in a format similar to the one below. As a minimum, the contractor shall include data on the following personnel:

4.2.1. Project Superintendent: The Project Superintendent shall have no less than 5 years experience as a project superintendent on construction projects of similar scope, size and complexity. The experience must demonstrate construction knowledge and ability to manage technically complex mechanical projects and be consistent with the type of construction provided for in this solicitation.

4.2.2. Project Manager: The Project Manager shall have a baccalaureate degree in a relevant field such as engineering or construction management with a minimum of three (3) projects that demonstrates the ability to construct projects similar in scope, cost and complexity to this contract **or** a person in the construction field with a minimum of 5 years in as a project manager on projects of the same scope, size and complexity of this contract.

4.2.3. CQC System Manager: The CQC (Contractor Quality Control) System Manager shall be a mechanical engineer with a minimum of five (5) years experience in related work or a mechanical engineering technician with ten (10) years of experience and five (5) years of experience in work related to this project. This experience must have occurred within the past ten (10) years.

4.2.4. Resume Format For Key Team Members. Resumes should be no more than two (2) pages per individual and submitted in a format similar to the one below:

RESUME FORMAT
Name and Title
1. Proposed Duties/Functions for this project
2. Firm Affiliation and Years Affiliated
3. Years of Experience performing duties/functions as proposed for this project.
4. Education – School attended, Degree, Certification, Year, and Specialization
5. List Active Registrations (Professional or Technical Licenses/Certifications)
6. Describe Specific Qualifications for this project
7. List Projects worked on to Include:
Project Title & Location
Scope, Size and Complexity
Duties/Functions
Date of project
8. Demonstrate how each project submitted is relevant to the project to be constructed under this solicitation

Evaluation Method: The more recent, and the greater the extent and relevance, of the team members' qualifications, prior project experience, and active registrations, the higher the rating assigned for this criterion during evaluations. Only one individual for each of the key personnel categories listed above will be evaluated.

4.3.3 **PAST PERFORMANCE OF THE PRIME**

Submittal Requirements: The Government will utilize performance evaluations contained in the Construction Contract Administration Support System (CCASS) to evaluate this criterion. All performance ratings for the past ten (10) years shall be considered. If an offeror does not have past performance available in CCASS or wishes to augment the CCASS system ratings, the offeror may ask customers to submit the Customer Satisfaction Survey form found at the end of this section.

For each project constructed for Private Industry, provide a completed Customer Satisfaction Survey for each applicable project that is currently under construction (at least 75% complete) or that was completed within the last ten (10) years. No more than five (5) customer satisfaction surveys will be considered for the prime firm for work not listed in the CCASS system. All Customer Satisfaction Surveys must be submitted to the Government from the customer or agency that is providing the information. Further instructions are found on the Customer Satisfaction Survey.

Submit a list of all customers (including current Point of Contact, phone number, and electronic address) who were requested to provide Customer Satisfaction Surveys.

Should offerors want to review the performance evaluation ratings contained in the Corps of Engineers CCASS Database, they may request the information by fax on company letterhead at the following number: (503) 808-4596.

Evaluation Method. The Government will evaluate the relative merits of each offeror's past performance. The Government reserves the right to consider all aspects of an offeror's performance history but will first evaluate the performance of those projects listed in 4.3.1 and 4.3.2. Projects involving co-firing (simultaneous natural gas and coal) and stoker applications combustion control installations (Bailey/ABB INFI-90) on boilers of equal or larger size to those in this solicitation that have been in satisfactory operation for two (2) years may be given more consideration. The Government reserves the right to contact the evaluators on previous Government or Private Sector work to verify the offeror's construction experience. In the case of an offeror without a record of past performance or for whom information on past performance is not available, the offeror **may not be evaluated as favorable or unfavorable** on past performance (See FAR 15.305(a)(2)(iv)).

4.3.4 **PROJECT SCHEDULE**

Submittal Requirements: The contractor shall provide an outline of the plan for construction in the form of milestone scaled (Gantt Chart) summary network diagram and shall graphically indicate sequences proposed to accomplish each milestone work operation and appropriate interdependencies between various milestone events. The chart shall be prepared in different color codes or graphic symbologies to differentiate base and option events. Identify critical elements of construction that could delay the entire project. The chart shall show the starting and completion times of all major events on a linear horizontal time scale beginning with the notice to proceed with the base contract items and indicating calendar days to completion of all options. **The offeror must state the total number of calendar days proposed from receipt of initial notice to proceed through completion of construction of all options.** Offerors should base their schedule on the information provided in the following Sections of the RFP: Section 00800, SC-1 Commencement, Prosecution and Completion of Work. Limit the activities to those critical to timely overall completion of the project

Evaluation Method: Consideration will be given for a schedule that identifies all critical elements that could delay the entire project. A schedule that is complete, reasonable, and realistic for this project may be given more consideration.

~~**4.3.5 TEMPORARY HEAT PLAN**~~

~~**Submittal Requirements:** Contractor shall provide a detailed plan to demonstrate how the firm will provide temporary heat to those buildings identified in Section 1100 of the~~

~~specifications whose sole heat source is the Central Heat Plant. Temporary heat shall be provided by "sidewalk" HTHW generators, or steam boilers operating in conjunction with steam to HTHW converters. HTHW shall be provided at a minimum temperature of 350 degrees F, and the number of generators/boilers shall be as required to provide a minimum total output capacity of 55 MMBTUH (55,000,000 BTUH). The fuel source for the temporary generating units shall be natural gas. Natural gas shall be provided by the government, however the contractor shall be responsible for all gas piping connections, as well as all temporary HTHW and steam generator connections to provide HTHW to the district heating system. Electrical power for operating the generators/boilers, and all necessary pumps shall be provided by the government, however all temporary and or permanent electrical connections shall be provided by the contractor.~~

~~**Evaluation Method:** The more complete, reasonable, and realistic the heat plan is for this project, the higher the rating assigned during evaluations.~~

4.3.~~6~~5 **EXTENT OF SMALL BUSINESS PARTICIPATION**

Submittal Requirements: No submittal is required for this criterion. The Government will utilize performance evaluations contained in the CCAS System to evaluate this criterion.

Evaluation Method: Firms will be evaluated for the success and extent of their small business participation in their subcontracting with small and disadvantaged business concerns. Firms will be evaluated based on the ratings received for item entitled "Implementation of Subcontracting Plan" on their past performance evaluations retrieved from the CCAS System. Firms without any evaluations in CCASS, or for which this item was not evaluated (i.e., N/A), will be assigned a neutral rating of satisfactory. Firms that receive a rating below satisfactory for this item in one or more CCASS evaluations will receive a rating of marginal for this criterion.

4.3.6 **SUMMARY OF TECHNICAL PROPOSAL FORMAT:** As a minimum, each copy of the technical proposal should contain the following general format for the volumes specified in the table below. It is preferred that pages be numbered consecutively throughout the technical proposal. However, giving each page a unique identifier within sections is acceptable (i.e., A-1 through A-5, then B-1 through B-5, etc).

Technical Proposal Format (original and 5 copies required)

- Technical Proposal Cover Letter
- Table of Contents. (List all sections of the technical proposal)
- Relevant Experience of the Prime
- Qualifications of Key Team Members
- Past Performance of the Prime
- Project Schedule
- ~~Temporary Heat Plan~~

5. PRICE PROPOSAL

5.1 **SUMMARY OF PRICE PROPOSAL FORMAT:**

Price Proposal Format (original and *(1)* copy required)

- Standard Form 1442 front and back
- Corporate Certificate (use the certificate for joint venture if applicable)
- Pricing Schedule (all pages)
- Section 00600, Representations and Certifications
- Bank and Bonding Points of Contact
- 20% Bid Bond
- Small and Small Disadvantaged Business Subcontracting Plan (large businesses only)
- Joint Venture Information (if applicable)

NOTE: Price proposal and bonds are DUE AT SAME TIME as technical proposals.

5.2 The price proposal must be signed by an official authorized to bind the organization. Prices must be provided for all line items on the pricing schedule. Note that the Standard Form 1442, Block 13D, states the minimum number of calendar days after the date offers are due for Government acceptance of the offer. All amendments must be acknowledged on Standard Form 1442 BACK by date and number in Block 19 or by telegram.

5.3 Provide the name, point of contact, phone number, and address for bank and bonding company of firm signing the SF 1442.

5.4 **Bid Bonds** must be accompanied by a **Power of Attorney containing an original signature from the surety**, which must be affixed to the Power of Attorney after the Power of Attorney has been generated. Computer generated and signed Powers of Attorney will only be accepted if accompanied by an original certification from a current officer of the surety attesting to its authenticity and continuing validity. Performance and payment bonds have the same requirement.

5.5 **Small Business Subcontracting. Large businesses are required to submit a subcontracting plan** (See FAR Clause 52.219-9 Alt II, Small Business Subcontracting Plan, Jan 2002) with initial price proposals. Award will not be made under this solicitation without an approved subcontracting plan. See the "Notice to Large Business Firms" located in the front of this solicitation.

5.6 **Joint Ventures.** No contract may be awarded to a joint venture that is not registered in the Central Contractor Register (CCR). Joint ventures may register in the following way:

(a) The firm that will be the recipient of payments should be registered in the CCR and have a DUNS number. This firm is considered in the CCR to be the "mother firm." If no money is to go to any other firm in the joint venture, the mother firm may make the other firm in the joint venture a "child." This child will be assigned the mother firm's CCR number with an additional four (4) numbers attached. Since the child firm is not receiving any payments, they do not need to get a DUNS number. HOWEVER, in order to cover all possibilities, it might be advisable to have each firm registered in the CCR.

(b) Call the CCR at 1-888-227-2423, choose option "0" to get the mother –child relationship set up. DUN & Bradstreet phone number is 1-800-333-0505.

(c) If the joint venture has a newly created name, then it must have its own DUNS number and register as such in the CCR.

5.6.1 In the cover letter of your proposal, provide the complete names, addresses, and phone and fax numbers of the two firms in the joint venture.

5.6.2 Signature requirements: SF 1442, SOLICITATION, OFFER, AND AWARD (pages 00010-1 and 00010-2), Block 20 requires that the name and title of the person authorized to sign the offer for the joint venture be provided.

5.6.3 Corporate certificate: Ensure that joint-venture portion is completed by both firms.

5.6.4 In the case of a joint venture, the following is required: A contract with joint venturers may involve any combination of individuals, partnerships, or corporations. The contract shall be signed by each participant in the joint venture in the manner prescribed below for each type of participant. When a corporation is participating, the Contracting Officer shall verify that the corporation is authorized to participate in the joint venture.

(a) Individuals. A contract with an individual shall be signed by that individual. A contract with an individual doing business as a firm shall be signed by that individual, and the signature shall be followed by the individual's types, stamped, or printed name and the words "an individual doing business as ……." [insert name of firm].

(b) Partnerships. A contract with a partnership shall be signed in the partnership name. Before signing for the Government, the Contracting Officer shall obtain a list of all partners and ensure that the individual(s) signing for the partnership have authority to bind the partnership.

(c) Corporations. A contract with a corporation shall be signed in the corporate name, followed by the word "by" and the signature and title of the person authorized to sign. The Contracting Officer shall ensure that the person signing for the corporation has authority to bind the corporation.

5.6.5 In addition to the requirements stated above, and to assure a single point of contact for resolution of contractual matters and payments, the Contracting Officer shall obtain a certificate signed by each participant in the joint venture as follows: In the proposal include the following statement:

"The parties hereto expressly understand and agree as follows:

a. **(name, title, and company)** is the principal representative of the joint venture. As such, all communications regarding the administration of the contract and the performance of the work thereunder may be directed to him or her. In the absence of **(same name, title, and**

company), (enter name, title, and company of alternate) is the alternate principal representative of the joint venture.

b. Direction, approvals, required notices, and all other communications from the Government to the joint venture, including transmittal of payments by the Government, shall be directed to **(enter name, title, and company of principal),** principal representative of the joint venture**."**

5.6.6 The bid bond form, Block "Principal" requires that the name and title of the person authorized to sign for the joint venture be included.

5.6.7 After award, the performance and payment bonds, and the insurance certificate(s) provided shall be in the name of the joint venture.

6. MAGNITUDE OF CONSTRUCTION AND SERVICES: The dollar magnitude of the construction portion of this solicitation is between ***($1 million and $5 million.)***

7. EVALUATION PROCEDURES

7.1 **TECHNICAL EVALUATION:** Technical proposals will be evaluated by a Technical Evaluation Team (TET) comprised of representatives of the Corps of Engineers and the Using Agency. Pricing data will not be considered during this evaluation. Criteria for the technical evaluation are set forth elsewhere in the solicitation and will be the sole basis for determining the technical merit of proposals. The TET shall utilize the relative importance definitions and technical merit ratings described earlier in this section of the solicitation to perform their technical evaluation. To be considered for award, proposals must conform to the terms and conditions contained in the RFP. No proposal will be accepted that does not address all criteria specified in this solicitation or which includes stipulations or qualifying conditions unacceptable to the Government.

7.2 **PRICE EVALUATION:** Price is of secondary importance to the technical criteria. Pricing will be independently evaluated to determine reasonableness and to aid in the determination of the firm's understanding of the work and ability to perform the contract. Financial capacity and bonding ability will be verified.

8. SELECTION AND AWARD: Subject to provisions contained herein, award of a firm fixed-price contract shall be made to a single firm. The Government will select the best-value offer based on technical merit and price.

8.3.1 **BEST VALUE ANALYSIS.** The Government is more concerned with obtaining superior technical features than with making award at the lowest overall cost to the Government. In determining the best value to the Government, the tradeoff process of evaluation will be utilized. The tradeoff process permits tradeoffs among price and technical factors, and allows the Government to consider award to other than the lowest priced offeror or other than the highest technically rated offeror. You are advised that greater consideration will be given to the evaluation of technical proposals rather than price. It is pointed out, however, that should

technical competence between offerors be considered approximately the same, the cost or price could become more important in determining award.

8.3.2 **SELECTION AND AWARD WITHOUT DISCUSSIONS: It is the intent of the Government to make award based upon initial offers, without further discussions or additional information.** Therefore, initial proposals should be submitted based on the most favorable terms from a price and technical standpoint. Do not assume there will be an opportunity to clarify, discuss or revise proposals. If award is not made on initial offers, a competitive range will be established and discussions conducted as described below.

8.3.3 **COMPETITIVE RANGE:** If it is not in the Government's best interest to make award on initial offers, the Contracting Officer will establish a competitive range of one or more offers and conduct discussions with those firms. When determining the competitive range, the Contracting Officer will consider the technical ratings and prices offered.

8.3.4 **DISCUSSIONS:** Discussions are usually conducted in writing, but may also be by telephone or in person. Discussions are tailored to each offeror's proposal and are only conducted with offeror(s) in the competitive range. The primary objective of discussions is to maximize the Government's ability to obtain the best value, based on the requirement and the evaluation criteria set forth in this solicitation. If a firm's proposal is eliminated or otherwise removed from consideration for award during discussions, no further revisions to that firm's proposal will be accepted or considered. Discussions will culminate in a request for Final Proposal Revision the date and time of which will be common to all remaining firms.

8.3.5 **AFTER DISCUSSIONS:** Revisions to the proposals submitted during discussions, if any, will be evaluated by the TET and, if warranted, an adjustment made to the rating previously assigned. The Contracting Officer will then perform a best value analysis based on the final prices and technical proposals. Selection will be made on the basis of the responsive, responsible firm whose proposal conforms to the RFP and represents the most advantageous offer to the Government, subject to availability of funds.

8.3.6 **DEBRIEFINGS:** Upon written request, unsuccessful firms will be debriefed and furnished the basis for the selection decision and contract award in accordance with FAR 15.505 and FAR 15.506.

8.3.7 **PROPOSAL EXPENSES AND PRECONTRACT COSTS:** This solicitation does not commit the Government to pay costs incurred in preparation and submission of initial and subsequent proposals or for other costs incurred prior to award of a formal contract.

8.3.8 **RELEASE OF INFORMATION:** After receipt of proposals and until contract award, source selection information will not be furnished to any firm.

END OF SECTION 00110

CUSTOMER SATISFACTION SURVEY (PAGE 1 OF 2) -
W912DW-04-R-0017, Central Heat Plant Application of Low Emissions Tech., Malmstrom AFB, Montana

SECTION 1 -- TO BE COMPLETED BY OFFEROR AND PROVIDED TO REFERENCE

Name of Firm Being Evaluated: _____

Project Title & Location: _____

Project Dollar Value: _____

Year Completed: _____ **Project Manager:** _____

SECTION 2 -- TO BE COMPLETED BY THE CUSTOMER REFERENCE AND MAILED, EMAILED, FAXED OR HAND-DELIVERED DIRECTLY TO:

U.S. Army Corps of Engineers, Seattle District
Attn: CENWS-CT-CB-CU Attn: Sherrye Schmahl
P.O. Box 3755
Seattle, WA 98124-3755

FAX: (206) 764-6817
Street Address:
4735 E. Marginal Way S.
Seattle WA 98134-2329

Forms submitted by other than the customer (i.e., by the offeror), may not be considered.

OVERVIEW: The firm shown above has selected you as a customer reference to provide information on the firm's past performance. Your input is important to this firm and responses are required no later than the time and date proposals are due for inclusion in our evaluation.

Name of Individual completing survey: _____
Firm Name: _____ **Phone Number:** _____
Relationship to this Project: _____
The chart below depicts ratings to be used to evaluate this contractor's performance.

O	AA	S	**M**	**U**
Outstanding	Above Average	Satisfactory	Marginal	Unsatisfactory
Performance met all contract requirements and exceeded expectations. Problems, if any, were negligible, and were resolved in a timely and highly effective manner.	Performance met all contract requirements and exceeded some. There were a few minor problems which the contractor resolved in a timely, effective manner.	Performance met contract requirements. There were some minor problems, and corrective actions taken by the contractor were satisfactory.	Performance did not meet some contractual requirements. There were problems, some of a serious nature, for which corrective action was only marginally effective.	Performance did not meet contractual requirements. There were serious problems, and the contractor's corrective actions were ineffective.

CUSTOMER SATISFACTION SURVEY (PAGE 2 OF 2)
W912DW-04-R-0017, Central Heat Plant Application of Low Emissions Tech., Malmstrom AFB, Montana

In the following blocks, please indicate your overall level of satisfaction with the work performed by the firm shown in Section 1. Reference the chart outlined on page 1 of this survey.
For any marginal or unsatisfactory rating, please provide explanatory narratives in the remarks block. These narratives need not be lengthy; just detailed. If a question is not applicable, circle N/A. If more space is needed, then go to the end of the questionnaire or attach additional pages. Be sure to identify your continued narration with the respect line number, your name and project name.

	Quality of Work	**Circle the appropriate rating using the chart on page 1**
A	Quality of Service	**O AA S M U N/A**
B	Quality Control	**O AA S M U N/A**
C.	Adequacy of Submittals/Reporting	**O AA S M U N/A**
D.	Identification/correction of deficient work in a timely manner	**O AA S M U N/A**
E.	Displayed flexibility in responding to your needs	**O AA S M U N/A**
F.	Organizational structure/functional relationships of the team including subcontractors	**O AA S M U N/A**
G.	Response time to your requirements	**O AA S M U N/A**
H.	Extent of participation of small business concerns as subcontractors under this contract	**O AA S M U N/A**
I.	Overall rating for this project	**O AA S M U N/A**
J	How well did the contractor & subcontractors adhere to schedule?	**O AA S M U N/A**
K.	Would you select this contractor again for future projects?	**Yes or No (circle one)**

REMARKS: (Discuss strengths and weaknesses of the firm)

Thank you for completing this form. Your assistance in providing this information is appreciated.

SECTION 15555A

MODIFICATIONS TO CENTRAL HIGH TEMPERATURE WATER (HTW) GENERATING PLANT AND AUXILIARIES

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASME INTERNATIONAL (ASME)

ASME B31.1	(2001) Power Piping
ASME BPVC SEC I	(2001) Boiler and Pressure Vessel Code; Section I, Power Boilers
ASME BPVC SEC IX	(2001) Boiler and Pressure Vessel Code; Section IX, Welding and Brazing Qualifications
ASME BPVC SEC VIII D1	(2001) Boiler and Pressure Vessel Code; Section VIII, Pressure Vessels Division 1 - Basic Coverage
ASME PTC 4.1	(1964; Addenda: 1968, 1969; R 1991) Steam Generating Units ++
ASME PTC 4.1	(1964; Addenda: 1968, 1969; R 1991) Steam Generating Units ++

ASTM INTERNATIONAL (ASTM)

ASTM A 36/A 36M	(2001) Carbon Structural Steel
ASTM A 366/A 366M	(1997e1) Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality **
ASTM A 568/A 568M	(2001) Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled
ASTM A 653/A 653M	(2001a) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM C 155	(1997) Standard Classification of Insulating Firebrick
ASTM C 27	(1998) Fireclay and High-Alumina Refractory Brick

ASTM C 34	(1996) Structural Clay Load-Bearing Wall Tile
ASTM C 401	(1991; R 2000) Alumina and Alumina-Silicate Castable Refractories
ASTM C 62	(2001) Building Brick (Solid Masonry Units Made from Clay or Shale)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 85	(2001) Boiler and Combustion Systems Hazard Code

UNDERWRITERS LABORATORIES (UL)

UL 795	(1999) Commercial-Industrial Gas Heating Equipment

1.2 GENERAL REQUIREMENTS

1.2.1 Standard Products

Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

1.2.2 Nameplates

Each major item of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the item of equipment.

1.2.3 Prevention of Rust

Unless otherwise specified, surfaces of ferrous metal subject to corrosion shall be factory prime painted with a rust inhibiting coating and subsequently factory finish painted in accordance with the manufacturer's standard practice. Equipment exposed to high temperature when in service shall be prime and finish painted with the manufacturer's standard heat resistant paint to a minimum thickness of 1 mil.

1.2.4 Equipment Guards and Access

Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts exposed to personnel contact shall be fully enclosed or guarded. High temperature equipment and piping exposed to contact by personnel or where it creates a fire hazard shall be properly guarded or covered with insulation of a type specified.

1.2.5 Use of Asbestos Products

Products which contain asbestos are prohibited. This prohibition includes items such as packings or gaskets, even though the item is encapsulated or the asbestos fibers are impregnated with binder material.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01330, "SUBMITTAL PROCEDURES":

SD-02 Shop Drawings

Gas Burners; G.

Detail drawings consisting of schedules, performance charts, brochures, diagrams, drawings, and instructions necessary for installation of equipment, and for piping, wiring, and devices. Complete setting plans certified by the equipment manufacturers. Drawings shall indicate clearances required for maintenance and operation and shall contain complete wiring and schematic diagrams, equipment layout and anchorage, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit.

Combustion Air Ductwork; G.
Flue Gas Breeching; G.
Replacement Tubes; G.

Detail drawings describing materials of construction, dimensions, weights, support, and layout in both plan and elevation.

SD-03 Product Data

Spare Parts;

Spare parts data for each item of equipment provided, after approval of the drawings and not later than 3 months before the date of beneficial occupancy. The data shall include a complete list of spare parts and supplies, with current unit prices and source of supply, and a list of the parts recommended by the manufacturer to be replaced after 1 and 3 years of service.

Manufacturer's Instructions;

Proposed diagrams, instructions, and other sheets, before posting. Framed instructions under glass or in laminated plastic, including wiring and control diagrams showing the complete layout of the entire system, shall be posted where directed. Condensed operating instructions explaining preventive maintenance procedures, methods of checking the system for normal safe operation, and procedures for safely starting and stopping the system shall be prepared in typed form, framed as specified above for the wiring and control diagrams, and posted beside the diagrams. The framed instructions shall be posted before acceptance testing of the systems.

Welding Qualifications;

A copy of qualified welding procedures and a list of names and identification symbols of qualified welders and welding operators.

Field Training;

Proposed schedule for field training, at least 2 weeks prior to the start of related training.

SD-06 Test Reports

Test Schedule; G.

A written schedule, 7 days before tests are performed. Schedule will be approved by the Contracting Officer.

Proposed Test Procedure;

A proposed performance test procedure, 30 days prior to the proposed test date. The submittal shall contain a complete description of the proposed test with calibration curves or test results furnished by an independent testing laboratory of each instrument, meter, gauge, and thermometer to be used in the tests. The test shall not commence until the procedure has been approved.

Boiler Emissions Report; G.

Boiler emissions report of air pollutants showing compliance with the limits established in the environmental permit and as specified herein.

Adjusting, Balancing, Testing and Inspecting; .

Test reports in booklet form showing field tests performed to adjust each component and field tests performed to prove compliance with the specified performance criteria, upon completing and testing the installed system. Each test report shall indicate the final position of controls. A written statement from the manufacturer's representative certifying that combustion control equipment has been properly installed and is in proper operating condition, upon completion of the installation. The action settings for automatic controls in the form of a typed, tabulated list indicating the type of control, location, setting, and function shall be included.

Startup Test Hardcopy Printout;.

Printed report of control system startup test.

SD-07 Certificates

Environmental Permit Compliance;
Experience; G.

Evidence of the Contractor's prior experience in installing similar equipment, including a list of 5 co-firing (simultaneous

natural gas & coal) and stoker applications combustion control installations (Bailey/ABB INFI-90) on boilers of equal or larger size that have been in satisfactory operation for 2 years prior to bid opening. Provide the location of the combustion control installations.

Certificates of Inspection, Test, and Calibration

Certificate of inspection, test, and calibration of instrumentation to be used during acceptance testing. Certificate of compliance with applicable codes after installation.

SD-10 Operation and Maintenance Data

Gas Burners;

Operating instructions, prior to the field training course. Six copies of operating instructions outlining the step-by-step procedures required for system startup, operation, and shutdown. The instructions shall include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and their basic operating features. Maintenance instructions, prior to the field training course. Six complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions shall include piping layout, equipment layout, and simplified wiring and control diagrams of the system as installed. The manuals shall also include equipment lubrication requirements and schedules, recommended spare parts list, index, instruction book binders with hard back covers and printing to identify the name of the facility, Government entity operating the facility, Contractor, shop order, equipment, and volume number if required. Operation and maintenance manuals shall be approved prior to the training course.

1.4 WELDING QUALIFICATIONS

Piping shall be welded in accordance with qualified procedures using performance qualified welders and welding operators. Procedures and welders shall be qualified in accordance with ASME BPVC SEC IX. Welding procedures qualified by others, and welders and welding operators qualified by another employer may be accepted as permitted by ASME B31.1. The Contracting Officer shall be notified 24 hours in advance of tests and the tests shall be performed at the work site if practicable. The welder or welding operator shall apply his assigned symbol near each weld he makes as a permanent record.

1.5 DELIVERY AND STORAGE

All equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variation, dirt and dust, or other contaminants.

1.6 VERIFICATION OF DIMENSIONS

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

PART 2 PRODUCTS

2.1 MODIFICATIONS TO HIGH TEMPERATURE WATER GENERATORS

Existing HTW generator (boiler) No. 1 is capable of operation on coal or natural gas. Existing Boiler No. 2 is capable of operation on natural gas only. Existing Boiler No. 3 is capable of operation on coal only. Boiler No. 1 and No. 3 each have an input capacity of 106 MMBtu/hr and an output capacity of 85 MMBtu/hr when operating on coal, when operating with 305 degrees F entering water temperature and 414 degrees F leaving water temperature with a water flow of 736,249 pounds per hour. Boiler No. 1 and No. 2 each have a capacity of approximately 30 MMBtu/hr when operating on natural gas only. Each boiler has a design pressure of 500 psig.

Modifications shall include all controls, piping, insulation, miscellaneous plant equipment, and other accessories indicated or necessary for the following major work elements:

a. Removal of gas burner from HTW generator No. 1 and associated boiler wall repair.

b. Addition of two 25 MMBtu/hr input to each gas burner on each HTW generator. No. 1 and No. 3, one on each side of boiler and associated tube bending and boiler wall work.

c. Addition of combustion air bypass and flue gas bypass around existing air heater on HTW generator No. 1 and No. 3.

d. Replacement of baskets and seals in Ljungstrom air heaters for Generators No. 1 and No. 3.

The equipment design and accessory locations shall permit accessibility for maintenance and service. Design conditions shall be as follows:

a. Site elevation, 3,527 feet.

b. Combustion air temperature, 80 degrees F.

The HTW generators shall be capable of operating continuously at maximum specified capacity without damage or deterioration to the generator, its setting, or firing equipment or auxiliaries. The generator shall be operable automatically while burning the fuel specified.

2.1.1 Electrical Equipment

Electric motor-driven equipment shall be provided complete with motors and necessary motor control devices. Motors and motor control devices shall be as specified in Division 16 specifications. Enclosures for electrical equipment shall be NEMA 4 or NEMA 12. Motors shall have electrical characteristics and enclosure type as shown. Unless otherwise indicated, motors of 1 hp and above shall be high efficiency type.

2.1.1.1 Motor Ratings

Motors shall be suitable for the voltage and frequency provided. Motors l/2 horsepower and larger shall be three phase, unless otherwise indicated. Ratings shall be adequate for the duty imposed, but shall not be less than indicated.

2.1.1.2 Motor Starters

Where a motor starter is not indicated in a motor control center on the electrical drawings, a motor starter shall be provided under this section of the specifications. Motor starters shall be provided complete with properly sized thermal overload protection and other equipment at the specified capacity including an allowable service factor, and other appurtenances necessary. Manual or automatic control and protective or signal devices required for the operation specified, and any wiring required to such devices, shall be provided whether indicated or not. Where two-speed or variable-speed motors are indicated, solid-state variable-speed controllers may be provided to accomplish the same function.

2.1.2 HTW Generator Design Requirements

2.1.2.1 Furnace Dimensions

Existing furnace dimensions are as follows:

a. Width (new burner firing direction), 12.46 feet.

b. Depth, 13.13 feet.

c. Height, 22 feet.

2.1.2.2 Burners

Burners shall conform to requirements of NFPA 85, except as otherwise specified. Flame safeguard controls shall be equipped with repetitive self-checking circuits.

2.2 HIGH TEMPERATURE WATER GENERATOR MODIFICATION DETAILS

2.2.1 HTW Generators and Components

Watertube, waterwall type HTW generating units shall be modified for the installation of gas burners, with the associated modifications to the existing over fire air system. Walls of the HTW generating units shall be modified to accommodate the installation, removal and rearrangement of gas burner using similar materials of construction and as shown on the contractors drawings.

2.2.1.1 Headers

Existing HTHW generator nameplate data is as follows:

HTHW Generator No. 1:
International Boiler Works Co.
Model TJW-VC-85

Serial No. 14891
IBW Job No. 2068-69-70
Heating Surface:
Boiler: 5,975 square feet
Waterwall: 1,284 square feet

HTHW Generator No. 3:
International Boiler Works Co.
Model TJW-VC-85
Serial No. 14892
IBW Job No. 2068-69-70
Heating Surface:
Boiler: 5,975 square feet
Waterwall: 1,284 square feet

Note: The International Boiler Works Co. is defunct. For information concerning existing HTW Generators and Components contact:

International Boiler, Inc.
Attn: Jeffrey Beals
3000 NE 30 Place, Suite 109
Ft. Lauderdale, FL 33306
phone: (954) 537-7787
fax: (954) 537-7785

2.2.1.2 Tubes

Replacement services and tubes for tube sections shown on the contract drawings shall be provided by International Boiler, Inc. at the Contractor's expense. Tubes shall be electric welded or seamless steel. Boilers shall have water-cooled furnace walls of a design suitable for the application. Tubes located in the primary furnace shall be designed for inclined or upflow of water. The water shall be distributed to the heating surface in proportion to the heat absorbing capacities of these surfaces. Tube heat absorbing surfaces shall be located so that radiant and convection sections provide for series flow of water, from generator inlet to outlet, to ensure uniform water distribution and uniform temperature rise from inlet to outlet.

2.2.1.3 Furnace

Existing furnace side walls and rear wall are water-cooled by vertical tubes with center-to-center spacing not to exceed twice the tube diameter, and are furnished with cast-iron, water-cooled armor block at the grate line to a height of not less than 18 inches above the grate line. The armor block are keyed and held in place without the use of bolts, pins, or mastic. The existing armor block shall be protected from damage during this work. See note added to Section 1 on Drawing M3.1 for revisions to the height of the new coal grate flame scanner to avoid having to modify the existing armor block.

2.2.2 HTW Generator Setting Materials

Materials shall conform to the following:

a. Firebrick: ASTM C 27, class shall conform to industry standards and ASME.

b. Insulating Brick: ASTM C 155, Class A.

c. Castable Refractory: ASTM C 401. The minimum modulus of rupture for transverse strength shall not be less than 600 psi after being heat-soaked for 5 hours or more at a temperature in excess of 3000 degrees F.

d. Mortar, Air-Setting, Refractory: Shall conform to industry standards and ASME.

e. Brick, Common: ASTM C 62.

f. Tile, Load-Bearing, Hollow: ASTM C 34, Grade LBX.

g. Iron and Steel Sheets: Galvanized, ASTM A 653/A 653M; gauge numbers specified refer to United States Standard gauge. Uncoated, black: ASTM A 568/A 568M, ASTM A 366/A 366M, or ASTM A 36/A 36M.

2.2.2.1 HTW Generator Casing

HTW generator walls shall be steel-encased wall construction with fabrication details as recommended by the HTW generator manufacturer. HTW generator wall lining shall consist of a continuous screen of closely spaced water tubes. Casing for HTW generators shall be double wall construction. Reinforced, welded, gas-tight inner casing shall be constructed of not lighter than 10 gauge black steel sheets. Outer casing shall be constructed of not less than 10 gauge steel sheets. Outer casing may be either bolted or welded. Inner casing shall be reinforced with structural steel to provide rigidity and prevent buckling. Inner casing in furnace section shall abut furnace tubes with no foreign sealer between the tube steel and the casing steel. Casing shall not be attached to tubes. The inner casing shall be applied so as to form expansion joints at the point of tube support. Welded joints and openings shall be checked by a pressure test. Any casing leakage shall be repaired and made pressure-tight. The maximum deflection of the reinforced panels shall not exceed 1/360 of the length of the maximum span. Block insulation shall be applied between the inner and outer casings and held securely with insulating pins. The casing tested shall be capable of holding a pressure of 1-1/2 times the predicted maximum furnace operating pressure of .15 inH2O (.28 mmHg).

2.2.2.2 Walls

High temperature block and mineral wool blanket shall be provided between an inner and outer casing. Thickness of insulation shall match adjacent construction.

2.2.2.3 Firebrick

Firebrick shall be laid up in air-setting mortar. Each brick shall be dipped in mortar, rubbed, shoved into its final place, and then tapped with a wooden mallet until it touches the adjacent bricks. Mortar thick enough to lay with a trowel shall not be permitted. Maximum mortar joint thickness shall not exceed 1/8 inch and average joint thickness shall not exceed 1/16 inch.

2.2.2.4 Plastic Refractory

Plastic refractory shall be installed in accordance with the manufacturer's recommendation and by workmen skilled in its application.

2.2.3 Boiler Fittings and Appurtenances

HTW generator fittings and appurtenances suitable for a HTW design pressure of 500 psig and 470 degrees F shall be installed with each HTW generator in accordance with ASME BPVC SEC I.

2.3 NATURAL GAS FUEL BURNING EQUIPMENT

MW Output	(Size) Type of Grate and Stoker
735 - 5860	Single retort, stationary grate, underfeed stokers
5860 - 8800	Single retort, moving grate, underfeed stoker
1465 - 22000	Reciprocating grate, front continuous ash discharge stoker
1465 - 29500	Vibrating conveyor grate, front continuous ash discharge stoker
5860 - 36500	Water-cooled, incline grate, hopper fed vibrating grate stoker
8800 - 120,000	Spreader stoker, continuous front ash discharge

(MBtuh Output	(Size) Type of Grate and Stoker
2,500 - 20,000	Single retort, stationary grate, underfeed stokers
20,000 - 30,000	Single retort, moving grate, underfeed stoker
5,000 - 75,000	Reciprocating grate, front continuous ash discharge stoker
5,000 - 100,000	Vibrating conveyor grate, front continuous ash discharge stoker
20,000 - 125,000	Water-cooled, incline grate, hopper fed vibrating grate stoker
30,000 - 400,000	Spreader stoker, continuous front ash discharge)

Natural gas fuel burning equipment shall be provided complete with flame safeguard system, forced draft low NO<SBS>x</SBS> burner, combustion air

windbox, piping, fuel train and instrumentation. Fuel burning equipment shall be designed for a maximum allowable working pressure of 40 psig. Each burner shall be capable of firing at a continuous rating of 25 MMBtu/hr input when the boiler is firing natural gas only, using natural gas at 9 psi. When co-firing with coal, each burner shall not run higher than 15 MMBtu/hr input. Provisions shall be incorporated for withdrawing and shielding the gas burner from over heating while firing coal only. Emissions guarantees shall apply through specified turndown range. Flue gas recirculation shall not be utilized. Burner shall have a stable flame over the turndown range. Primary air spinner zone, zone divider and main burner shall be removable without removing the entire register or windbox. Register front plate shall have a swivel scanner and observation port. Natural gas fuel burning equipment shall limit emissions to 0.15 pounds of NOx/MMBtu of heat input.

2.3.1 Pilot

a. Pilot burner shall be natural gas-electric type with the capacity required to reliably light off the boiler. A high voltage secondary side ignition transformer shall be supplied and mounted backside of the windbox.

b. Provision shall be made in the burner housing for inspection of the pilot flame.

c. Pilot shall be provided with individual manual shut-off valve, pressure gauge, strainer, pressure regulation separate from the main burner, self closing solenoid valve and vent valve in accordance with FM P7825a, FM P7825b and UL 795. Pilot and valving shall be in accordance with NFPA 85.

2.3.2 Burner Refractory Throat

Burner refractory throat shall be made of high quality castable refractory suitable for 3000 degrees F. The precast refractory in a steel retaining ring with stainless steel anchors shall be shipped separately for field mounting on the boiler. Burner refractory throat shall be concentric with the burner, contoured to ensure complete mixing of air and natural gas, and designed to assist in complete combustion by radiating heat to the fuel. Burner shall be so positioned that the flame parallels the contour of the burner refractory throat but avoids striking the refractory.

2.3.3 Windbox

Windbox shall provide even airflow. Windbox shall not interfere with boiler smoke box door operation and shall have a flange bottom for easy firm mounting on a support structure.

2.3.4 Combustion Air Fan

Combustion air fan shall be centrifugal type with backwardly inclined air foil bladed wheel. Combustion air-fan wheel shall be directly driven by a TEFC NEMA frame motor and shall be complete with inlet cone and screen and flange outlet. Combustion air fan shall be bottom flanged to be mounted on same structural member as windbox. Combustion air-fan shall be minimum sized to provide sufficient static pressure to overcome system losses when providing 15 percent excess air at maximum firing rate.

2.3.5 Combustion Air Damper and Jack Shaft Control

Combustion air damper shall be flanged and located at combustion air fan inlet. Combustion air damper shall be mechanically linked with an adjustable jack shaft that automatically adjusts the amount of combustion air supply required for the specified burner capacity turndown.

2.3.6 Natural Gas Burner

Natural gas burner shall be a multi-spud burner with gas feed pipe in center of air register for easy removal. Natural gas burner shall be forced draft type and shall be suitable for efficiently burning natural gas having a calorific value of 1,000 Btu per cubic foot when supplied at a pressure of approximately 9 psig. Natural gas shall be discharged in burner throat area. Natural gas-air premix or natural gas discharged outside of burner throat are not acceptable. Main natural gas burner shall be capable of firing the boiler to maximum capacity with a turndown of five (5) to one (1) with a 4-20 mA signal.

2.3.7 Natural Gas Burner Retract Equipment

Each natural gas burner shall be provided with a pneumatic actuator for retracting the gas burner nozzle from the refractory burner throat and a guillotine refractory damper with a pneumatic actuator that seals the refractory burner throat opening after the natural gas burner nozzle is retracted. The damper shall be provided with a seal air fan that limits the amount of air inleakage to the furnace to a maximum of 55 scfm when the damper is in the closed position. Refractory for the guillotine damper shall be as specified herein. Pneumatic actuators shall be piston and cylinder type, sealed and double acting. Cylinders and pistons shall be sized for operating 125 percent of the required load with an instrument air pressure range of 70-120 psig. Piping for each pneumatic actuator shall be complete including tubing, fittings, filter regulator set, four-way 120 VAC solenoid valve, speed control valves, isolation and bypass valves and a single point connected with the instrument air system. The assembly shall include mechanically operated position switches, DPDT, to indicate inserted and retracted positions for the gas burner nozzle retract actuator and open and closed positions for the guillotine damper actuator. The natural gas burner retract equipment shall be manually controlled from the burner management system control panels next to the new burner platforms. Controls shall be provided with appropriate interlocks for safe operation of the burner retract equipment. As a minimum, the burner shall not be capable of being retracted with natural gas flow. The burner management system control panel shall be provided with position indicating lights for burner nozzle inserted and retracted and guillotine damper closed and open.

2.3.8 Flame Safeguard System

a. The flame safeguard system per burner shall be manufactured by burner manufacturer and mounted near the boiler as a panel. Flame safeguard system components shall be UL listed. Complete and automatic flame safeguard system shall be provided in accordance with NFPA requirements for safe start-up, on-line operation and shut-down of package burner.

b. Flame safeguard system shall be micro-processor per boiler based system including, but not limited to, automatic burner sequencing, flame supervision, status indication, fire-out annunciation and self diagnostics.

c. Flame safeguard system cabinet shall house overcurrent protective devices and motor starters for the combustion air fan motor and burner damper motor. Control transformers and an RS-232C serial communication port shall also be included.

d. Flame scanner shall not require a separate purge air supply. Flame scanner output signal shall be connected to flame amplifier module in microprocessor based unit. Within four seconds after loss of flame, flame safeguard controller shall shut the automatic safety shut-off fuel valves and open the gas automatic vent valve. Flame failure signal shall be displayed on flame safeguard display or burner control panel.

e. A separate adjustable coal grate flange scanner shall be provided for each boiler above the grate as shown on the contract drawings.

f. Logic provided with flame safeguard system shall:

1. Prevent introduction of ignitor flame (pilot) or main fuel flame to furnace until furnace, boiler passes, breeching and stack have been purged of combustible gases.

2. Prevent opening of automatic fuel shut-off valves in main fuel line until ignitor flame is proven.

3. Limit trial for main fuel ignition to ten (10) seconds from time ignitor flame is proven.

4. In event of burner failure, operator intervention shall be required to manually reset flame safeguard controller prior to restart.

5. Allow gas burner startup without a pre-purge cycle, when coal is being combusted as detected by the coal grate flame scanner.

g. First-out annunciation per burner shall be provided by an expansion module. Alarms and flame-outs shall be individually annunciated at panel front and transmitted along with other process points monitored by the panel to existing Bailey DCS for graphic display. The following points, at a minimum, shall be individually annunciated by flame safeguard system:

1. High outlet water temperature (from DCS).

2. High and low natural gas pressure.

3. Low oxygen concentration (from DCS).

4. Low water flow (from DCS).

5. Combustion airflow.

6. Ignitor failure.

7. Main flame failure.

8. Furnace pressure (from DCS).

h. Flame safeguard system cabinet shall be provided for natural gas fuel.

i. Indicating lights shall also be provided for following:

1. Limits satisfied.

2. Purging.

3. Pilot ON.

4. Main flame ON.

5. Flame failure.

6. Natural gas ON.

j. Indicating pilot lights shall be industrial, oil-tight construction with push-to-test feature or "All-Pilot Lights" test button.

2.3.9 Boiler Piping Trains

Piping train shall be completely prepiped, wired and mounted on boiler. Natural gas train shall be in accordance with NFPA and FM standards and requirements and shall include but not be limited to following items:

2.3.9.1 Natural Gas Trains

a. NFPA 54 and ANSI Z83.3.

b. Natural gas flow control valve with characterizing adjustments to match airflow.

c. Y-type strainer supplied in ignitor natural gas line.

d. Two (NC) solenoid safety shut-off valves, in series, in ignitor line with one (NO) solenoid vent valve located between safety shut-off valves, piped independently to atmosphere through the roof.

e. Two motorized shut-off valves with proof of closure, piped in series in main gas line with one (NO) solenoid vent valve located between safety shut-off valves, piped independently to atmosphere through the roof.

f. One pressure regulating valve in ignitor natural gas line to regulate natural gas pressure to ignitor.

g. Pressure gauge, with shut-off valve for main natural gas at burner.

h. Pressure gauge, with shut-off valve for natural gas ignitor.

i. Low natural gas pressure switch.

j. High natural gas pressure switch.

2.4 WASTE HEAT RECOVERY EQUIPMENT

Each existing boiler is equipped with an air preheater, separate from the boiler, which preheats combustion air that is delivered beneath the grate when firing coal. Bypasses, complete with opposed or parallel blade dampers as shown on the contract drawings, shall be added on both the combustion air and flue gas sides of the existing air heaters serving Boiler No. 1 and No. 3.

2.5 OVERFIRE AIR DUCT MODIFICATIONS

Overfire air ducts shall be relocated to accommodate burner installation on the right side of HTHW Generators No. 1 & 3. In addition, cast iron fly ash reinjection nozzles (three per generator) shall be removed and a new 2 inch diameter overfire air duct shall be installed from the existing overfire air header to the new Detroit Stoker overfire air nozzles in the rear wall of HTHW Generators No. 1 & 3. Size of overfire air nozzles shall match existing.

2.6 UNDER GRATE AIR DUCT MODIFICATIONS

Under grate air duct bypasses around air heaters shall be constructed of 3/16 inch thick steel plate conforming to ASTM A 36/A 36M. Ductwork shall be adequately reinforced and braced with structural steel angles not smaller than 2 x 2 x 3/16 inches on no more than 10 foot spacing, and all joints and seams in the sheets and angles shall be welded. Expansion joints shall be installed as indicated and as required to suit the installation and shall be flexible type requiring no packing. Ductwork shall have angle flanges and gaskets for connection to equipment. Ductwork connections shall be gas-tight and caulked-tight all around and sealed with cement to form an air-tight joint. Clean-out openings of suitable size and at approved locations shall be provided for access to all sections of the breeching and shall have tight-fitting, hinged, cast-iron doors with cast-iron frames.

2.7 BREECHING MODIFICATIONS

Breeching bypasses around air heaters shall be constructed of 3/16 inch thick steel plate conforming to ASTM A 36/A 36M. Breeching shall be adequately reinforced and braced with structural steel angles not smaller than 2 x 2 x 5/16 inches on no more than 2 foot spacing, and all joints and seams in the sheets and angles shall be welded. Expansion joints shall be installed as indicated and as required to suit the installation and shall be flexible type requiring no packing. Breeching shall have angle flanges and gaskets for connection to equipment. Breeching connections shall be gas-tight and caulked-tight all around and sealed with cement to form an air-tight joint. Clean-out openings of suitable size and at approved locations shall be provided for access to all sections of the breeching and shall have tight-fitting, hinged, cast-iron doors with cast-iron frames.

2.8 FABRIC EXPANSION JOINTS

2.8.1 General

Fabric expansion joints shall be integral flanged, U-belt design consisting of flexible element, backing bars, flow baffle, nuts, bolts and washers and have an operating temperature suitable for 300 degrees F on combustion air ductwork and 500 degrees F on flue gas breeching.

Acceptable manufacturers or approved equal of these joints are the following:

a. Frenzelit North America Inc. - Purcellville, VA 540-338-2076.
b. Advanced Flexible Systems, Inc. - Charleston, SC 800-724-4175.
c. Hutch Engineering, Inc. - Canton, GA 770-751-9123.
d. Senior Flexonics Pathway - New Braunsfels, TX 800-292-2152.
e. Papco Industries, Inc. - Northvale, NJ 201-767-9051.

Flexible element, backing bars, and flow baffle shall be drilled to match adjacent breeching or equipment flanges. In open sections of breeching, the maximum spacing between hole centers shall be 6 inches. Design shall allow fit between adjacent breeching or equipment without disassembly of the adjoining breeching or equipment. Flow direction shall be marked on the expansion joint.

2.8.2 Flexible Element

The flexible element shall be designed to uncouple the forces and moments between adjoining sections due to thermal expansion while maintaining structural integrity. Design shall simultaneously allow .5 inches of compression, 1 inch of lateral relative motion and 1 degree of rotation in any plane. The flexible element material shall be suitable for the design temperature and contact with flue gas from coal combustion with a 2.50 to 3.81 percent sulfur coal.

2.8.3 Backing Bars

Backing bars shall be provided for the full width and circumference of the seal. Backing bars shall be ASTM A 36, a minimum of 2 inches wide by 3/8 thick, free of burrs and sharp edges, and coated with a rust-resistant primer.

2.8.4 Flow Baffle

The flow baffle shall be ASTM A 36 carbon steel, 1/8 inch thick, bolt-in design, fastened between flexible element and adjacent breeching or equipment flange, designed to protect flexible element from particulate abrasion throughout the range of thermal movements.

2.8.5 Fasteners

Fasteners shall be 5/8 inch bolts with flat washer between the bolt head and the backing bar, and a lock washer between the nut and adjacent breeching or equipment flange. Bolts shall be of adequate length to expose a minimum of two (2) threads beyond the nut after tightening. Bolts dimensions shall be in accordance with ASME B18.2.1 and be threaded in accordance with ASME B1.1, Class 2A. Bolts shall be ASTM A 307, Grade B, zinc-coated for operating temperatures up to 550 degrees F and ASTM A 193, Grade B7, heavy hex for operating temperatures above 550 degrees F. Nut dimensions shall be in accordance with ASME B18.2.2 and threaded in accordance with ASME B1.1, Class 2B. Nuts shall be ASTM A 563, Grade A, zinc-coated, heavy hex for

operating temperatures up to 550 degrees F and ASTM A 194 Grade 7, heavy hex for operating temperatures above 550 degrees F.

2.9 LOUVER DAMPERS

2.9.1 General

Louver dampers shall be balanced weight, multiple blade type. Blades shall be opposed blade (combustion air) or parallel blade (flue gas and minimum leak,) as indicated on the Contract Drawings. Opposed blade dampers shall be designed for throttling service. Blade dampers shall be designed for shut-off service and shall be provided with sealed blade ends. Dampers shall be designed for a maximum shut-off pressure of 5 inches of water and a maximum temperature of 550 degrees F. Design shall allow fit between adjacent breeching or equipment without disassembly of the adjoining breeching or equipment.

2.9.2 Detailed Requirements

The frame shall be 12 inch, 20.7 pound channel with 5/8 inch diameter holes on a maximum of 6 inch center spacing. Blades shall be 10 gauge carbon (minimum) steel, bolted, double skin, air foil design. Blade seals shall be overlap and stepped. Shafts shall extend the total length of the blades and be Type 304 stainless steel. Brackets, linkages, bearings and packing shall be located and be serviceable from outside the gas stream. Bearings shall be graphite, self-lubricated, rated for 1000 degrees F service. The brackets and linkages shall be carbon steel. Non-machined, metal surfaces shall be power tool cleaned, solvent washed, and coated with a primer suitable for 500 degrees F.

2.9.3 Operator

The dampers shall be provided with a pneumatic actuator integrally mounted on the frame. The design shall be sized to operate satisfactorily with a 60 to 80 psig instrument air supply. Dampers designed for modulating service shall be provided with positioners suitable for 4 to 20 mA signal, with direct or reverse feedback. The selection and arrangement of the spring, solenoid, positioner, if required for modulating service, and the wiring and pneumatic connections shall meet the air and electrical failure positions specified on the Contract Drawings. Speed control on damper to open to closed in 1.0 minutes and closed to open in 1.0 minutes.

2.10 INSULATION

Shop and field applied insulation shall be as specified in Section 15080A "THERMAL INSULATION FOR MECHANICAL SYSTEMS".

2.11 TOOLS

Special tools only shall be furnished and shall include all uncommon tools necessary for the operation and maintenance of controls, meters and other equipment. Small hand tools shall be furnished with a suitable cabinet, mounted where directed.

2.12 ASH HANDLING SYSTEM

2.12.1 Boiler Room Ash Handling System

The existing ash handling system is of the dry pneumatic type. This system gathers ash from the boiler under grate and bottom ash hoppers, mechanical dust collector, and the baghouse hoppers, and discharges to the ash storage silo located outside of the building. An existing ash dust control conditioner is used to reduce fugitive dust emissions during discharge of ash from the storage silo. This ash dust conditioner (dustless unloader) shall be replaced with a new ash unloader system in accordance with Section 14710, "Ash Unloader System."

2.13 MODIFICATIONS TO EXISTING LJUNGSTROM AIR HEATERS (GENERATORS NO. 1 & 3)

Existing air heaters are the regenerative type constructed of materials adequate to withstand the corrosion effects of the flue gases. Modifications shall preclude cold-end corrosion of the air heater under any load condition. Temperatures of all metals in contact with flue gas shall be above the flue gas maximum dewpoint temperature for the fuel being fired under all load conditions. Control shall be by automatic bypass and shall be integrated with the combustion control system.

The existing air heaters were manufactured by:

Air Preheater Company
Alstom Power Inc.
3020 Traux Road, P.O. Box 372
Wellsville, NY 14895
Contract No. LAP-4128
Size 3-13 FIK
Serial Nos. 6992, 6993 or 6994

2.13.1 Modifications to Reduce the Heat Transfer Rate and Meet the Following Operating Conditions

Contractor shall replace existing hot end and cold end gasketed heating elements with new having reduced heat transfer capabilities. Seals and mounting hardware installation shall also be replaced to reduce leakage from air side to flue gas side.

Combustion air and flue gas bypasses shall be installed around the air heater to provide further reduction of heat transfer. With HTHW generator loads above approximately 80 percent, spray dryer absorber (SDA) inlet temperature shall be controlled using modulating dampers on the combustion air side of the air heater (D-1 & D-2). This normal mode of operation shall maintain a flue gas temperature of 350 degrees F to the SDA, allowing the SDA to operate at its optimum efficiency. A special condition will exist when HTHW generator outlet flue gas temperature drops below 414 degrees F. At this time the combustion air side shall track in full bypass, and the flue gas side shall go into bypass. As the load increases and the HTHW generator outlet flue gas temperature increases above 430 degrees F, the flue gas bypass dampers (D-3 & D-4) shall go out of bypass mode. The combustion air side shall be released from track and allowed to modulate, controlling the SDA inlet temperature at 350 degrees F.

Load	100%	90%	80%
Flow Rates Lbs/Hr			
Air Entering	80,066	56,100	25,500
Air Leaving	65,266	42,000	13,000
Gas Entering	92,693	88,270	80,872
Gas Leaving	107,493	102,370	93,372
Cold Air Bypassed	7,495	26,583	50,889
Leakage	14,800	14,100	12,500
	15.97%	15.97%	15.46%
Temperatures Deg. F			
Air Entering	68	68	68
Air Leaving	152	157	226
Mixed Air to Grate	143	121	100
Gas Entering	448	431	414
Gas Leaving w/o Leakage	393	392	391
Gas Leaving w/ Leakage	351	350	350
Average Cold End	231	230	230
Pressure Diff. In. W.G.			
Pressure Drop Air	0.15	0.10	0.05
Pressure Drop Gas	0.35	0.30	0.30
Hot End Diff.	8.90	8.20	7.10
Cold End Diff.	9.40	8.60	7.45

2.13.2 Material List of Changes

Material list of changes shall include:

Item No.	Description	Qty	U/M
1	Cold End Full Sector Baskets	2	Sets
2	Hot End Full Sector Baskets	2	Sets
3	Hot & Cold Radial Seals;	2	Sets
	Holding Strips; Heavy Fasteners	2	Sets
4	Hot & Cold Circ. Seals;	2	Sets
	Holding Strips; Fasteners	2	Sets
5	Hot & Cold Post Seals	2	Sets
6	Hot End Circ. Clamp Assy.	2	Sets

2.13.3 Service Engineer

Service engineer from manufacturer shall perform:

Inspection during field construction and approval of construction methods/quality.

Field performance test on each unit in operation over operating load range.

PART 3 EXECUTION

3.1 MODIFICATION OF BOILER AND AUXILIARY EQUIPMENT

Equipment shall be installed as indicated and in accordance with manufacturers' instructions.

Alternations to HTHW generators shall be made in accordance with the established standards, procedures, and applicable codes. Maintenance of the HTHW generator ASME stamp certification shall be ensured. Alternations to HTHW generators shall not be initiated without authorization of a special boiler inspector authorized by the State of Montana and the National Board of Boiler and Pressure Vessel Inspectors. Contractor performing alterations to HTHW generators shall hold a National Board "R" stamp. Special boiler inspector shall inspect HTHW generator alterations.

3.2 FIELD PAINTING AND COATING

Except as otherwise specified, ferrous metal shall be cleaned, prepared, and painted as specified in Section 09900 PAINTS AND COATINGS. Exposed pipe covering shall be painted as specified in Section 09900 PAINTS AND COATINGS. Aluminum sheath over insulation shall not be painted.

3.3 TESTS

3.3.1 Hydrostatic Tests

Following modification of tubes, HTW generator No. 1 and No. 3 shall be tested hydrostatically and proved tight under a gauge pressure of 1-1/2 times the specified working pressure. Following the installation of all piping and boiler house equipment, but before the application of any insulation, hydrostatic tests shall be made and the system proved tight under gauge pressures of 1-1/2 times the specified working pressure. Tests shall be made under the direction of, and subject to, the approval of the Contracting Officer. The Contractor shall adjust all equipment and controls before the scheduled operational test. A testing schedule shall be submitted at least 15 days before scheduled test.

Note: The boilers each have isolation valves, though they cannot be guaranteed to hold.

a. The boiler MAWP's are 500#.
b. Each boiler has two safety relief valves, one set at 500# and one set at 515#.
c. The safety valves have 4"-300# flanged inlets and 6"-150# flanged outlets.

3.3.1.1 Water Sides Including Fittings and Accessories

Water sides shall be hydrostatically tested in accordance with the requirements of ASME BPVC SEC I and ASME BPVC SEC VIII D1 as applicable.

3.3.1.2 Generator Casing, Air Casings, and Ducts

Leak testing shall be limited to work performed under this contract as follows:

a. New Furnace Tube Work:
   Pressurize furnace to +0.15 inches of water using F.D. fan and O.F.A. fan; smoke bomb test.
b. Burner Windboxes:

Temprarily block new refractory throat; pressurize using new burner F.D. fan; soap test.

c. Combustion Air Ductwork:
Close under grate blast gate (at windbox); pressurize using existing F.D. fan; soap test.

d. Flue Gas Breeching:
Close spray dryer inlet damper and spray dryer baghouse bypass damper; pressurize furnace using F.D. fan and O.F.A. fan; smoke bomb test.

3.3.2 Capacity and Efficiency Tests, Burners Only

The capacity and efficiency at the specified capacity of the generator shall be determined in accordance with the ASME PTC 4.1 for steam generating units adjusted for High Temperature Hot Water units. The efficiency shall be determined by the direct input-output method and shall be checked with the loss method computation. Test runs shall be made at the maximum capacity for 4 hours; at the minimum capacity and at 50 percent capacity for 2 hours each, respectively. Test reports and performance curves shall be submitted to the Contracting Officer. Before any operational tests are conducted, the system shall be correctly balanced within 5 percent of that indicated. Corrections and adjustments shall be made as necessary to produce the required conditions. Approved methods shall be used to measure all rates of flow. The efficiency and general performance tests on the boilers shall be conducted by a qualified test engineer furnished by the Contractor, and observed by a representative of the Contracting Officer. Testing apparatus shall be set up, calibrated, tested, and readied for testing the boiler before the arrival of the representative of the Contracting Officer. Calibration curves or test results furnished by an independent testing laboratory for each instrument, meter, gauge, and thermometer to be used in efficiency and capacity test shall be furnished before the test. A test report including logs, heat balance calculations, and tabulated results together with conclusions shall be delivered in quadruplicate. An analysis of the fuel being burned on the test shall be submitted to the Contracting Officer. The analysis shall include all pertinent data tabulated in the ASME PTC 4.1 abbreviated efficiency test. The Contractor shall provide and install all necessary piping, valves, controls, and heat exchanger to provide a load for testing each HTW generator. If any system load is available, the Contracting Officer will provide for loading the heating system for the test, but full-load capability will probably require the supplementary heat exchanger for the test. Should Item No. 0009, Provide Load Simulator System, not be awarded, it will be acceptable to postpone testing, without penalty to the Contractor, until such time as the Government can provide a full system load from existing buildings and equipment.

3.3.3 Operating Tests, Burners Only

After adjustment and achievement of stable operation of the HTW generators, each shall be tested continuously for 12 hours, minimum, to demonstrate control and operational conformance to the requirements of this specification under varying load conditions ranging from the specified capacity to the minimum burner turndown ratio without on-off cycling. In each case, the operating tests shall cover the periods for the capacities tabulated below:

Waterwall Watertube Boilers

Time (minimum)	Percent of Capacity
First 2 hours	20
Next 2 hours	50
Next 2 hours	75
Next 6 hours*	100

* The efficiency tests may be conducted either concurrently with the operating tests or separately at the option of the Contractor.

3.3.4 Operating Tests, Burners and Stoker

After adjustment and achievement of stable operation of the HTW generators, each shall be tested continuously for 12 hours, minimum, to demonstrate control and operational conformance to the requirements of this specification under varying load conditions ranging from the specified capacity to the minimum burner and stoker turndown ratio without on-off cycling. In each case, the operating tests shall cover the periods for the capacities tabulated below:

Waterwall Watertube Boilers

~~Time (minimum)~~ Time (minimum)	~~Boiler Percent of Capacity~~ Boiler Percent of Capacity	~~Burners Heat Input~~ Heat Input per Burner
First 2 hours	35	~~10 x 105~~ MMBtu/hr
Next 2 hours	50	10~~ x 10~~ MMBtu/hr
Next 2 hours	75	12~~ x 10~~ MMBtu/hr
Next 6 hours*	100	15~~ x 10~~ MMBtu/hr

* The efficiency tests may be conducted either concurrently with the operating tests or separately at the option of the Contractor.

3.3.5 Test of Natural Gas Fuel Burning Equipment

a. Test of fuel burning equipment shall demonstrate that equipment installed will meet requirements of specifications, and that overall efficiency is as specified, with not over 15 percent excess air, can be obtained with burners operating at 100 percent capacity without flame impingement on any combustion chamber wall, floor, baffle or watertube. Protect the grates from overheating.

b. Test shall include all boiler and burner interlocks, safety interlocks, combustion controls, actuators, valves, controllers, gauges, thermometers, pilot lights, switches, etc. prior to combustion testing. All malfunctioning components shall be replaced. Submit an itemized data record sheet of this component testing.

c. Each boiler control system and all boiler appurtenances shall be calibrated and set to ensure the specified performance. The fuel burner, forced-draft fan, controls, etc. shall be fully coordinated, manually capable, and automatically controllable to hold the required settings. The boiler fuel burning system shall be continuously variable throughout the specified operating range

without manual adjustment of burner, register or nozzle, and turndown shall be achieved without manual adjustment. Testing apparatus shall be set up, calibrated, tested and ready for use prior to final combustion testing. Calibration certificates for all test instruments shall be furnished with test data.

3.3.5.1 Sequencing

The HTW generator shall start, operate, and stop in accordance with the specified operating sequence.

3.3.5.2 Flame Safeguard

The operation of the flame safeguard control on gas-fired burners shall be verified by simulated flame and ignition failures. Burners having continuous or intermittent pilots shall be tested by simulating main flame failure while the pilot is burning. The trial-for-pilot ignition, trial-for-main-flame ignition, combustion control reaction, and valve closing times shall be verified by stop watch.

a. Immunity to Hot Refractory: The burner shall be operated at high fire until the combustion chamber refractory reaches maximum temperature. The main fuel valve shall then be closed manually. The combustion safeguard shall drop out immediately causing the safety shutoff valves to close within the specified control reaction and valve closing times.

b. Pilot Intensity Required: The fuel supply to the pilot flame shall be gradually reduced to the point where the combustion safeguard begins to drop out (sense "no flame") but holds in until the main fuel valve opens. At this point of reduced pilot fuel supply, the pilot flame shall be capable of safely igniting the main burner. If the main fuel valve can be opened on a pilot flame of insufficient intensity to safely light the main flame, the generator shall be rejected.

c. Turndown Ratio: The specified turndown ratio shall be verified by firing at the minimum firing rate.

d. HTW Generator Limit and Fuel Safety Interlocks: Safety shutdown shall be caused by simulating interlock actuating conditions for each generator limit and fuel and safety interlock. Safety shutdowns shall occur in the specified manner.

e. Combustion Controls: The accuracy range and smoothness of operation of the combustion controls shall be demonstrated by varying the demand throughout the entire firing range required by the turndown ratio specified for the burner and stoker and in the case of automatic sequenced burners by further varying the firing rate to require on-off cycling. The control accuracy shall be as specified.

f. Safety Valves: Safety valves on HTW generators shall not be tested under operating conditions.

3.4 CLEANING OF HTW GENERATORS AND PIPING

3.4.1 HTW Generator Cleaning

After the hydrostatic tests have been made, and before performance of the operating tests, the tubes modified under this project, from the upper header to the lower header shall be thoroughly and effectively cleaned of foreign materials. Wherever possible, surfaces to be cleaned that are in contact with water shall be wire brushed to remove loose material, the fire side need not be cleaned. The Contractor may use the following procedure or may submit his own standard procedure for review and approval by the Contracting Officer. HTW generators shall be filled with a solution consisting of the following proportional ingredients for every 1000 gallons of water, and operated at approximately 30 to 50 psig for a period of 24 to 48 hours:

24 lb. caustic soda; 8 lb. sodium nitrate; 24 lb. disodium phosphate, anhydrous; and 1/2 lb. approved wetting agent.

Chemicals in the above proportions, or as otherwise approved, shall be thoroughly dissolved in the water before being placed in the HTW generator. After the specified boiling period, the boilers shall be allowed to cool, and then drained and thoroughly flushed. Piping shall be cleaned by operating the HTW generators for a period of approximately 48 hours.

3.5 MANUFACTURER'S SERVICES

Services of a manufacturer's representative who is experienced in the installation, adjustment, and operation of the equipment specified shall be provided. The representative shall supervise the installing, adjusting, and testing of the equipment. Contractor shall provide a minimum of two (2) weeks of burner manufacturer's representative on site for combustion control adjustment. Scheduling shall coincide with the visit of the manufacturer's representative for the variable frequency drives for the ID fan motors. Service engineers shall startup, calibrate and place in automatic operation the following:

1. Burner & Burner Management System

2. Bypass dampers and controls

3. I.D. fan motor VFD

The following additional field services shall be provided:

1. One day of field labor to witness loop testing of burner management field wiring. Indicated in writing if not satisfied with all field wiring at the end of this period, or wiring will be treated as acceptable.

2. Three days of field assistance during boiler "ASME power code test". The above assistance time periods are not necessarily contiguous. Field service engineer shall oversee and manage the boiler "boil-out", burner adjustment, ASME power code test, and Demonstration. This field service engineer will not be replaced during startup without prior written notice and consent of the Contracting Officer. If any phase of startup or commissioning is delayed because additional parts are required, the burner and burner management service engineer shall remain in the field.

3. System will be acceptable when the system is in automatic control operating at 10 MMBtu/hour load changes in one (1) minute from low load to high load or high to low load, or intermittent swing loads without noticeable pulsation, and the manufacturer's service engineer is not adjusting controllers on natural gas. The following performance guarantees shall be demonstrated to the Contracting Officer. The system shall be operated within the range of 10 MMBtu/hour to 50 MMBtu/hour (heat input) with load swings of 10 MMBtu/hour/minute in either direction. All measurements will be made using 15 minute averaging. The system shall be operated in the automatic mode only without burner and combustion controls adjustment. The following guarantees shall be demonstrated:

	Natural Gas Only
Particulate Matter EPA Method 1-5 (270 degrees F Filter)	0.005 lbs/10 million Btu
Particulate Matter (Opacity EPA Method 9)	Less than 10%
Nitrogen Oxides (NO & NO2) EPA Method 7E	0.15 lbs/million Btu Heat Input
Carbon Monoxide EPA Method 10B	0.11 lbs/million Btu Heat Input
From Minimum Load, Heat Input	20%
To Maximum Load, Heat Input	100%

4. Provide five (5) man days of operational training by the burner service engineer. The service shall not adjust the system during this week. This week will also be used as the operational acceptance test. If the service engineer needs to adjust the burner or controls, then this week will be repeated at no additional cost.

5. Retain the services International Boiler, Inc. to inspect and approve all generator tube work and casing/insulation work.

3.5.1 Field Training

A field training course shall be provided for designated operating staff members. Training shall be provided for a total period of 2 weeks of normal working time and shall start after the system is functionally complete and adjusted, but prior to final acceptance tests. Field training shall cover all of the items contained in the approved operating and maintenance instructions. Field training time is separate from startup and adjustment.

-- End of Section --